Low Carbon Fuel Standards: Trends and Challenges

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Driving US Ethanol Demand

- Domestic Environmental Standards
  - Renewable Fuel Standard (RFS2)
  - California Low Carbon Fuel Standard (LCFS)
  - Oregon Clean Fuel Standard (CFP)
  - Washington Low Carbon Fuel Standard (LCFS)
- International Environmental Standards
  - Canada Renewable Fuel Standard (RFR)
  - British Columbia Low Carbon Fuel Requirement (RCLFRR)

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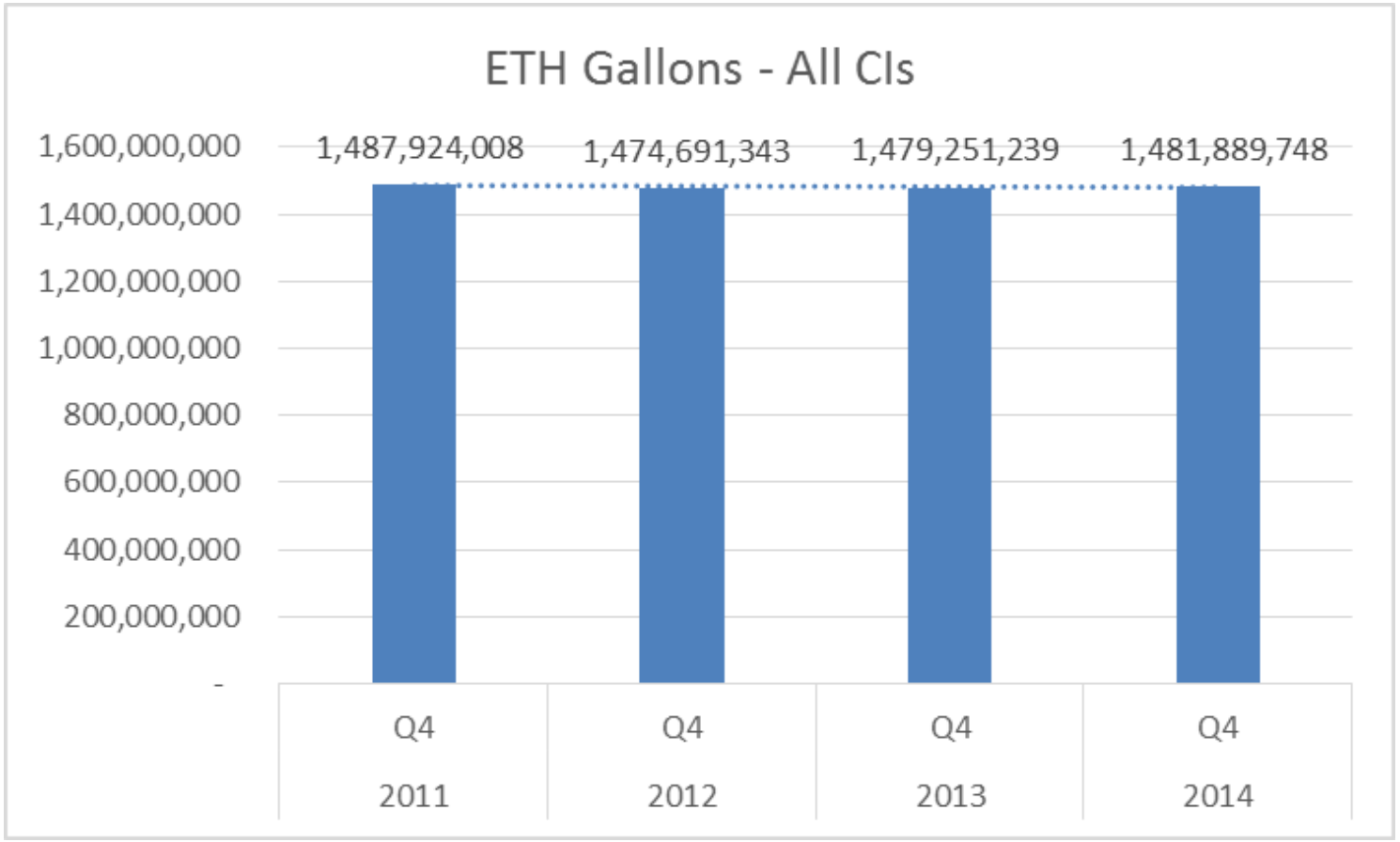
California

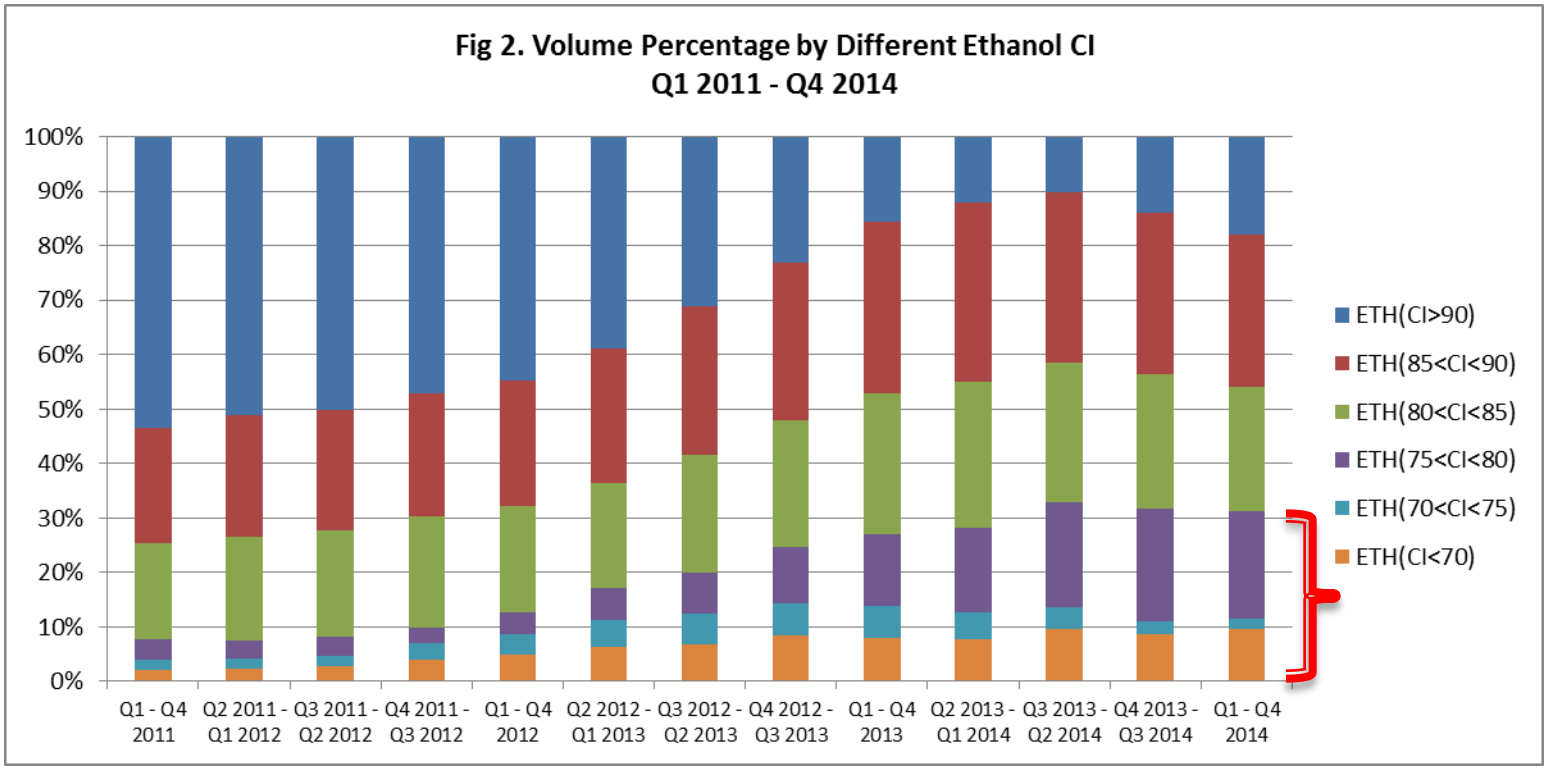
- How has the California market changed since 2011 implementation?
  - Trends in LRT Data
- Re-adoption Efforts
- What is the compliance schedule?
- What are the compliance challenges?

California



Source: CARB LRT
Quarterly Data Summary.

California



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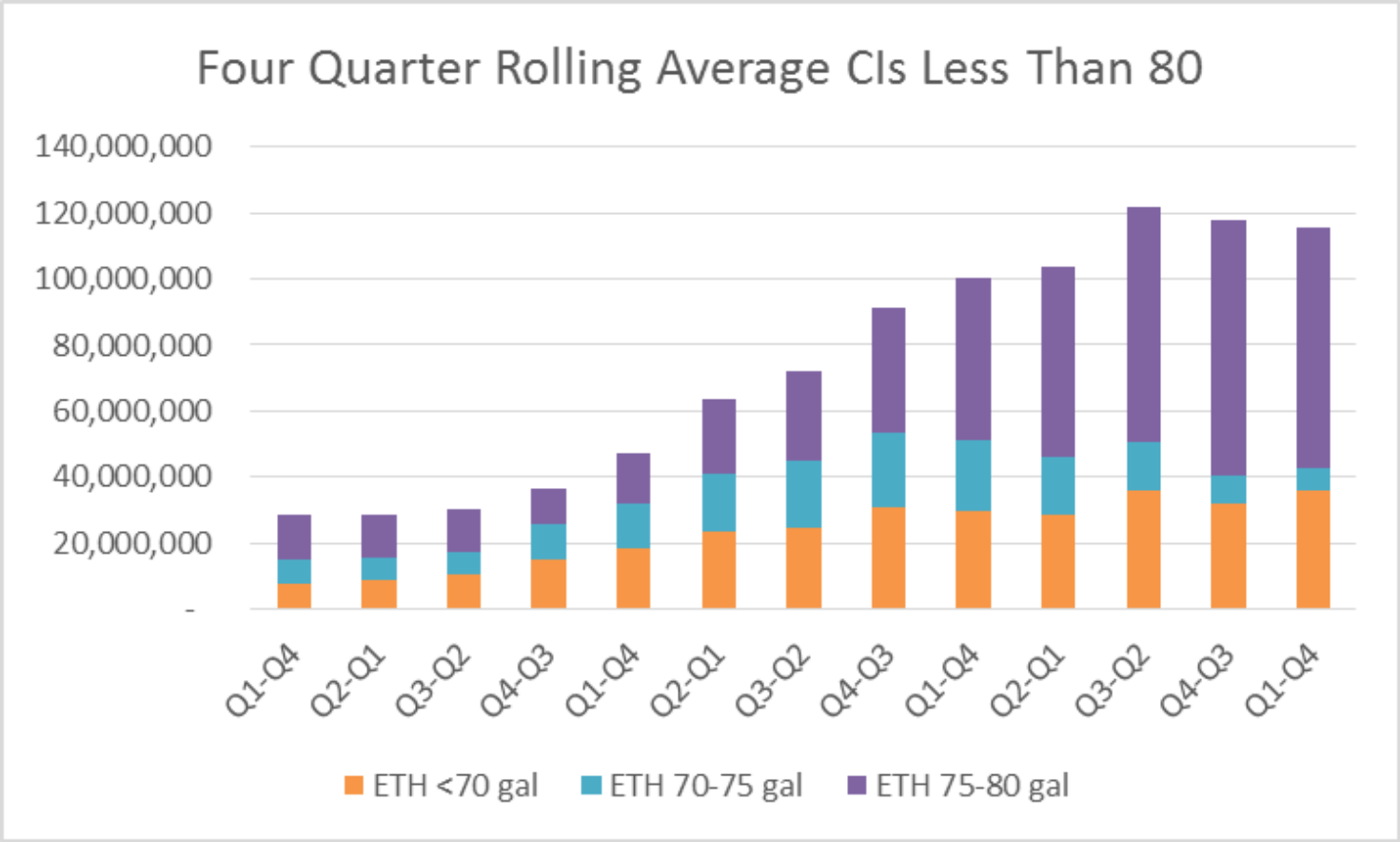
California



Source: CARB LRT
Quarterly Data Summary.

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California LCFS Re-Adoption

Concepts included in Proposed Rule:

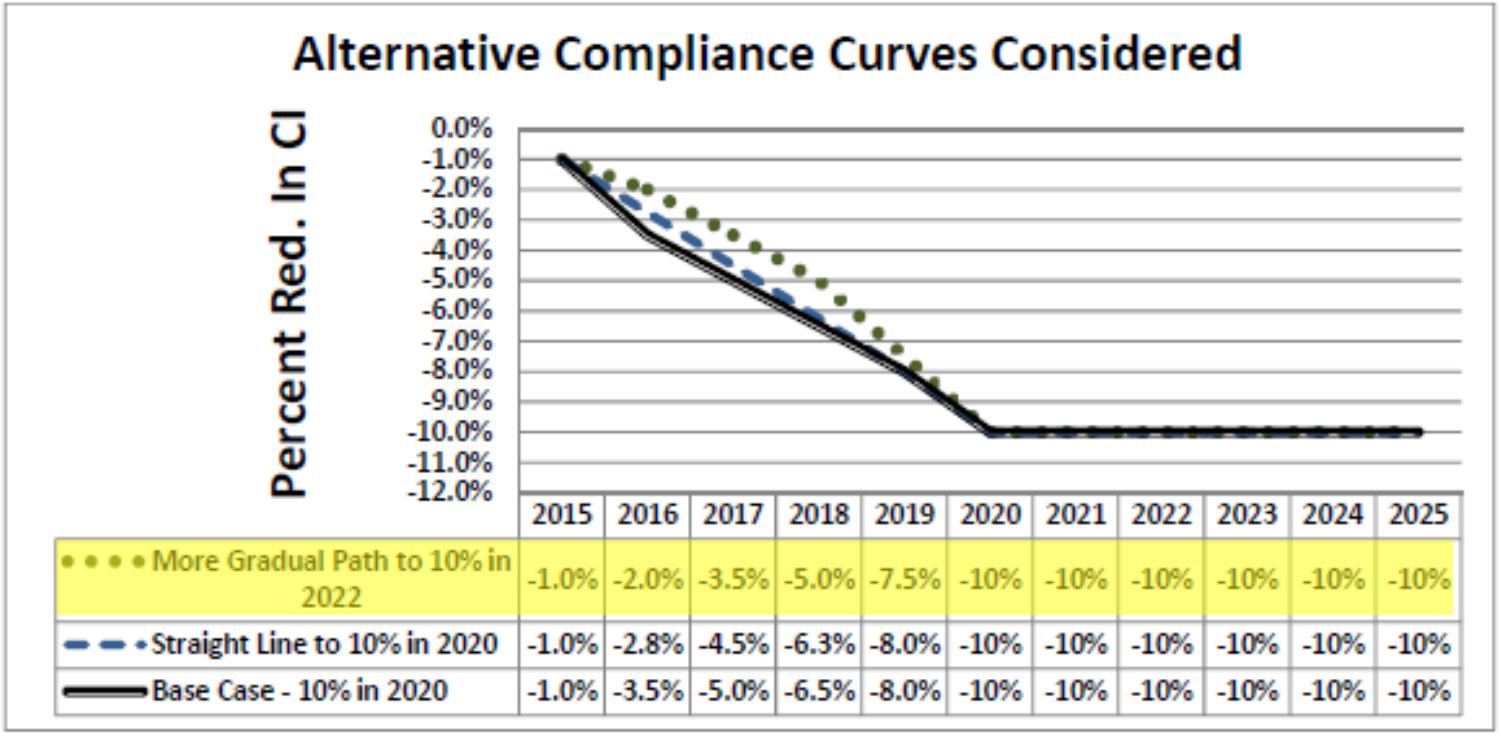
1. Updates to indirect land use change (iLUC)
   a. Corn Ethanol down to 19.8
2. Updates to CA-GREET model
3. Tier 1 and 2 Fuel Producer Pathway registration
   a. No default pathways for Tier 1 Fuel
4. Sun-setting of existing Fuel Pathways

Impact Ethanol CI

1. Modification of Compliance Curve
2. Cost containment provision "Credit Clearance"
3. Credit price cap - $200 MT
4. ADF Rule for Biodiesel/RD
5. Refinery GHG Emission Reduction credits
6. Electricity off-road application credits

Impact Overall Program

California Compliance Schedule



	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
More Gradual Path to 10% in 2022	-1.0%	-2.0%	-3.5%	-5.0%	-7.5%	-10%	-10%	-10%	-10%	-10%	-10%
Straight Line to 10% in 2020	-1.0%	-2.8%	-4.5%	-6.3%	-8.0%	-10%	-10%	-10%	-10%	-10%	-10%
Base Case - 10% in 2020	-1.0%	-3.5%	-5.0%	-6.5%	-8.0%	-10%	-10%	-10%	-10%	-10%	-10%

Source: CARB LRT
Quarterly Data Summary.

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California Compliance Challenges

- Can enough low CI ethanol be provided to fully offset gasoline deficit
- Limitations and blending constraints
- Potential for enforcement action
  - Up to $35,000 per day for Strict liability
  - Up to $50,000 per day for negligence
  - Up to $250,000 per day for willful and intentional violations
  - Annual Compliance Violations, up to $1,000 for every deficit

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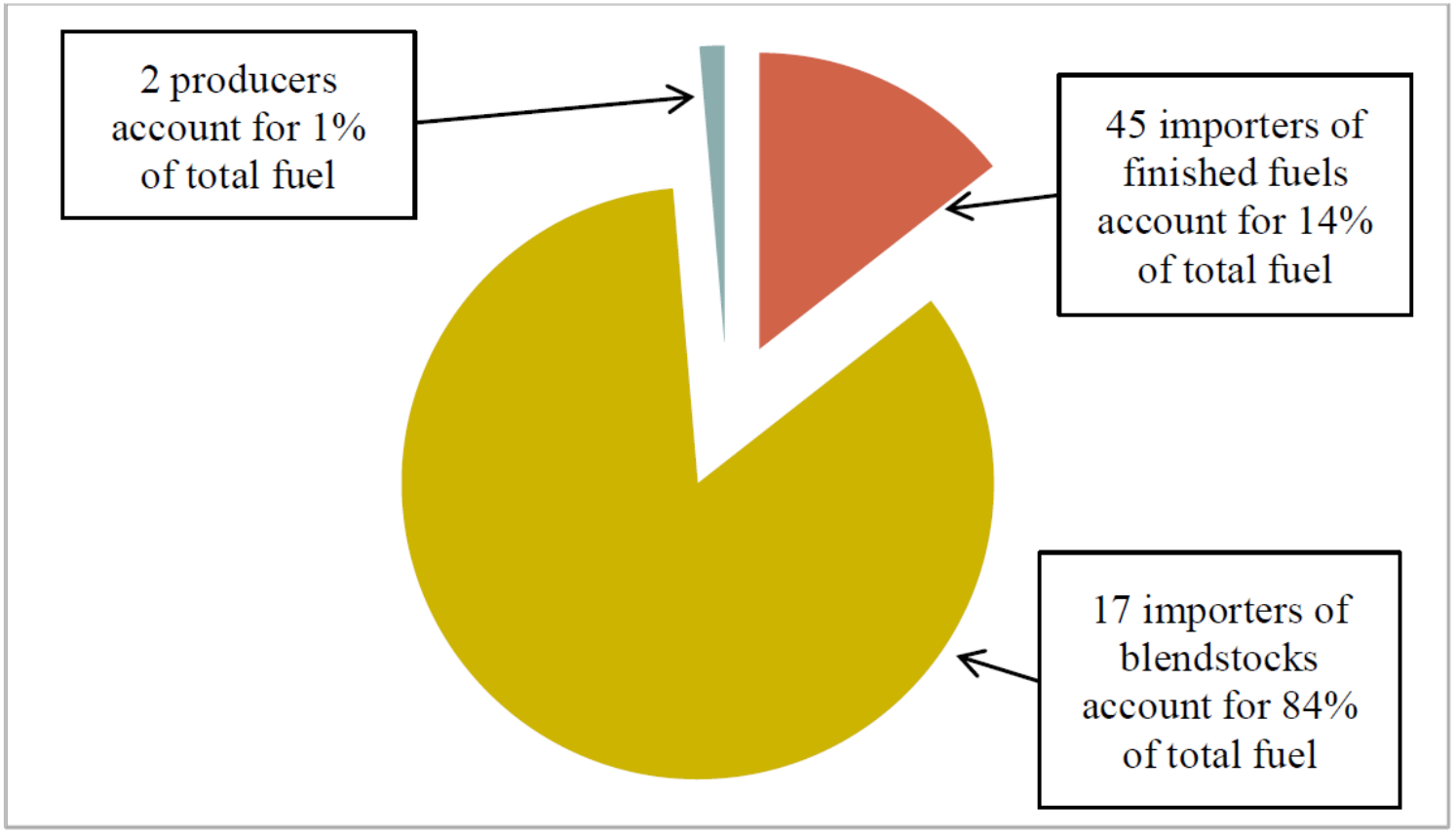
Pacific Coast Action Plan on Climate and Energy

- California, Oregon, Washington and British Columbia
- Signed late October 2013 under the Pacific Coast Collaborative
- II (1) “Adopt and maintain low-carbon fuel standards in each jurisdiction.”

Oregon

- How does the Oregon ethanol market differ from California?
  - Trends in DEQ data
- What is the compliance schedule?
- What are the compliance challenges?

Oregon



Source: DEQ Phase II discussion documents.

Oregon

Oregon Clean Fuel Standard for Gasoline and Gasoline Substitutes

Table #1 **Oregon Clean Fuel Standard for Gasoline and Gasoline Substitutes**		
Calendar Year	Oregon Clean Fuel Standard (gCO2e per MJ)	Percent Reduction
2015	None (Gasoline Baseline is 89.31)	
2016	89.08	0.25 percent
2017	88.86	0.50 percent
2018	88.41	1.00 percent
2019	87.97	1.50 percent
2020	87.08	2.50 percent
2021	86.18	3.50 percent
2022	84.84	5.00 percent
2023	83.50	6.50 percent
2024	82.16	8.00 percent
2025 and beyond	80.36	10.00 percent

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Oregon Compliance Challenges

- Future inclusion of indirect land use change (iLUC)
  - At what rate and how will it impact credit generation?
- The legislative sunset has been lifted
- Multiple lawsuits filed
- Communicating with venders and customers

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Washington

- Where is Washington in their development?
  - Issued a Discussion Document
  - Held public webinars for discussion
- Governor has proposed tying LCFS to education and infrastructure budgets

Washington

Clean Fuel Standard for gasoline and gasoline substitutes[1]

Calendar Year	Clean Fuel Standard (gCO2e per MJ)	Percent Reduction
2016	None[2]	None
2017	99.65	0.25%
2018	99.40	0.50%
2019	98.90	1%
2020	98.40	1.50%
2021	97.40	3%
2022	96.40	4%
2023	94.91	5%
2024	93.41	6%
2025	91.91	8%
2026 and beyond	89.91	10%

1. Motor gasoline in 2012 contained 9.72% denatured ethanol by volume (6.68% by energy).
2. Gasoline baseline is 99.90.

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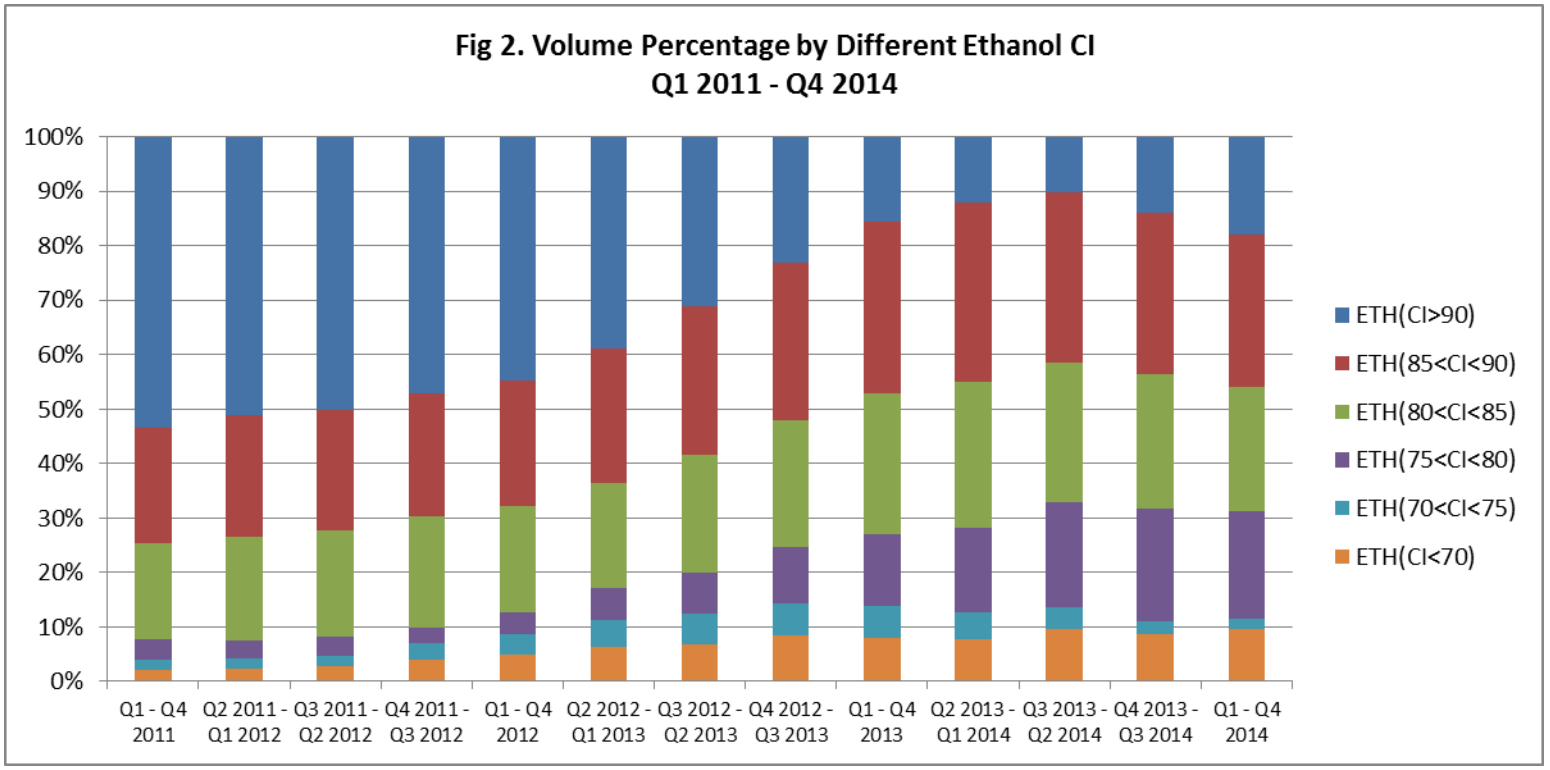
How Will Demand Be Met?



How Will Demand Be Met?